

ABSTRACT OF THE DISCLOSURE

An air-fuel ratio control apparatus for controlling an air-fuel ratio of an air-fuel mixture to be supplied to an internal combustion engine having a plurality of cylinders so that the air-fuel ratio coincides with a target air-fuel ratio. An air-fuel ratio is detected by an air-fuel ratio sensor provided at a position downstream of a joining portion of an exhaust manifold connected to the plurality of cylinders. Model parameters of a controlled object model defined by a relation between an air-fuel ratio detected by the air-fuel ratio sensor and a fuel supply amount parameter that specifies a fuel supply amount to each cylinder of the engine. A degree of differences between air-fuel ratios of air-fuel mixtures to be supplied to the plurality of cylinders is determined according to the identified model parameters.